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| EXAMINER | |
|---|---|
| BELLO, AGUSTIN | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2633 | |

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/075,780 | YOO, SUNG-JOO | |
| | Examiner | Art Unit | |
| | Agustin Bello | 2633 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 September 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *3,5,8,15-18 and 21-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3,5,8,15-18 and 21-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

**2.** Claims 5, 21-23, and 25-26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this case, the applicant's specification is silent to the actual method by which wavelength conversion takes place without conversion of the payload/modulated optical carrier to electrical form recited in claims 5, 25. The specification is further fails to provide a written description of a modulator with an electrical input signal as recited in claims 21-23, 26.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3, 5, 8, 15-18, and 24, are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang (U.S. Patent No. 6,525,850) in view of Mizrahi (U.S. Patent No. 6,067,181).

Regarding claims 3, 8, and 24, Chang teaches in an optical communication system, a method for swapping control information of a baseband optical signal comprising: applying, to

an optical fiber, a subcarrier multiplexed baseband optical signal (column 6 line 25 - column 7 line 30), said subcarrier multiplexed baseband optical signal composed of a modulated optical carrier including a payload without control information (e.g. data payload separate from header subcarrier, column 6 lines 43-47 and column 7 lines 3-5) and a modulated optical subcarrier including control information without payload (e.g. header information at a subcarrier separated from the data payload column 7 lines 3-5), the modulated optical subcarrier being at a subcarrier frequency which is separated from the modulation bandwidth of the optical carrier (column 7 lines 3-5), receiving the subcarrier multiplexed baseband optical signal, optically separating the modulated optical subcarrier from the modulated optical carrier, directing the modulated optical subcarrier to an optical energy transducer (column 10 lines 54-60, column 11 lines 18-22, 30-36, column 18 lines 19-41), then applying the modulated optical carrier to an optical modulator adapted for writing new subcarrier modulated control information (column 21 lines 51-62). Chang differs from the claimed invention in that Chang fails to specifically teach using a three port optical circulator coupled to a Bragg grating to separate the modulated optical subcarrier from the modulated optical carrier by receiving the subcarrier multiplexed baseband optical signal at an input port of an optical circulator; applying the subcarrier multiplexed baseband optical signal via an extraction port of the optical circulator to a fiber Bragg grating; optically separating the modulated optical subcarrier in the fiber Bragg grating while reflecting the modulated optical carrier back to the extraction port of the optical circulator; and outputting the modulated optical carrier to an output port of the optical circulator. However, separating signals of a multiplexed signal via a three-port circulator coupled to a Bragg grating is very well known in the art. Mizrahi teaches a system wherein a multiplexed signal is received at an input port of

an optical circulator (reference numeral 32 in Figure 1); applied via an extraction port (reference numeral 33 in Figure 1) of the optical circulator to a fiber Bragg grating (reference numeral 40 in Figure 1); the signal to be separated then being optically separating in the fiber Bragg grating while the signal to be propagated along the optical fiber is reflected back to the extraction port (reference numeral 33 in Figure 1) of the optical circulator; the signal to be propagated being output to an output port of the optical circulator (reference numeral 34 in Figure 1). One skilled in the art would have been motivated to use the circulator/Bragg grating device of Mizrahi in the system of Chang in order to more efficiently separate the data payload from the subcarrier signal of the header. One skilled in the art would also have recognized that use of the device of Mizrahi in the system of Chang, for instance at the output of the dispersion compensator (reference numeral 1205 in Figure 12), would have eliminated the need for the elements in Chang which serve to filter out the data payload from the subcarrier frequency (e.g. filter 930 in Figure 9) and vice-versa (e.g. filter 830 in Figure 8), thereby reducing the overall cost of the system of Chang. Furthermore, it is clear that the device of Mizrahi could have easily been incorporated in to the system of Chang without departing from the scope of the invention of Chang. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have incorporated the optical circulator and Bragg grating arrangement of Mizrahi into the system of Chang in order to efficiently separate the subcarrier from the data payload at less cost.

Regarding claim 5, Chang teaches a method for controlling the propagation path of a baseband optical signal comprising: applying, to an optical fiber, a subcarrier multiplexed baseband optical signal (column 6 line 25 - column 7 line 30), said subcarrier multiplexed baseband optical signal composed of a modulated optical carrier including a payload without

control information (e.g. data payload separate from header subcarrier, column 6 lines 43-47 and column 7 lines 3-5) and a modulated optical subcarrier including control information without payload (e.g. header information at a subcarrier separated from the data payload column 7 lines 3-5), the modulated optical subcarrier being at a subcarrier frequency which is separated from the modulation bandwidth of the optical carrier (column 7 lines 3-5), receiving the subcarrier multiplexed baseband optical signal at the input to a routing element (e.g. network elements in the system), optically separating the modulated optical subcarrier from the modulated optical carrier, directing the modulated optical subcarrier to an optical energy transducer (column 10 lines 54-60, column 11 lines 18-22, 30-36, column 18 lines 19-41), changing the wavelength of the optical carrier for the payload in response to the control information (column 17 lines 3-15); and directing the optical carrier for the payload along one of a plurality of output paths from the routing element responsive to the control information (column 17 lines 3-15), and the step of modulating the directed optical carrier to add a subcarrier containing new control information (column 21 lines 51-62). Chang differs from the claimed invention in that Chang fails to specifically teach using a three port optical circulator coupled to a Bragg grating to separate the modulated optical subcarrier from the modulated optical carrier by receiving the subcarrier multiplexed baseband optical signal at an input port of an optical circulator; applying the subcarrier multiplexed baseband optical signal via an extraction port of the optical circulator to a fiber Bragg grating; optically separating the modulated optical subcarrier in the fiber Bragg grating while reflecting the modulated optical carrier back to the extraction port of the optical circulator; and outputting the modulated optical carrier to an output port of the optical circulator. However, separating signals of a multiplexed signal via a three-port circulator coupled to a

Bragg grating is very well known in the art. Mizrahi teaches a system wherein a multiplexed signal is received at an input port of an optical circulator (reference numeral 32 in Figure 1); applied via an extraction port (reference numeral 33 in Figure 1) of the optical circulator to a fiber Bragg grating (reference numeral 40 in Figure 1); the signal to be separated then being optically separating in the fiber Bragg grating while the signal to be propagated along the optical fiber is reflected back to the extraction port (reference numeral 33 in Figure 1) of the optical circulator; the signal to be propagated being output to an output port of the optical circulator (reference numeral 34 in Figure 1). One skilled in the art would have been motivated to use the circulator/Bragg grating device of Mizrahi in the system of Chang in order to more efficiently separate the data payload from the subcarrier signal of the header. One skilled in the art would also have recognized that use of the device of Mizrahi in the system of Chang, for instance at the output of the dispersion compensator (reference numeral 1205 in Figure 12), would have eliminated the need for the elements in Chang which serve to filter out the data payload from the subcarrier frequency (e.g. filter 930 in Figure 9) and vice-versa (e.g. filter 830 in Figure 8), thereby reducing the overall cost of the system of Chang. Furthermore, it is clear that the device of Mizrahi could have easily been incorporated in to the system of Chang without departing from the scope of the invention of Chang. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have incorporated the optical circulator and Bragg grating arrangement of Mizrahi into the system of Chang in order to efficiently separate the subcarrier from the data payload at less cost.

Regarding claims 15-18, the combination of references teaches detecting using an output of said optical energy transducer (reference numeral 1210 in Figure 12 of Chang and reference

numeral 45 of Figure 1 of Mizrahi) a low-frequency electrical component of said modulated optical subcarrier.

***Response to Arguments***

5. Applicant's arguments filed 9/16/05 have been fully considered but they are not persuasive. The applicant is directed to column 6 line 25 – column 7 line 30 of Chang for disclosure of the subcarrier multiplexing. This location in Chang has been cited for all of the office actions as being the location which discloses subcarrier multiplexing.

As to applicant's failure to see how Chang reads upon "applying the modulated optical carrier to an optical modulator adapted for writing new subcarrier modulated control information," as required in claim 3 and similar limitations in claims 5 and 8, it is noted that Chang clearly discloses writing a new subcarrier onto the modulated optical carrier in column 22 lines 33-38. Furthermore, the combination of Chang with the circulator of Mizrahi specifically meets the ability to precisely separate the subcarrier from the modulated optical carrier.

Finally, the applicant is directed to the previously submitted and currently updated 112 rejection discussed above which in fact rejected claims 21-23 in the office action dated 8/9/05.

6. Applicant's arguments filed 5/16/05 have been fully considered but they are not persuasive. The applicant's argument that the cited references fail to teach subcarrier multiplexing is not convincing. The examiner maintains that subcarrier multiplexing is indeed taught by the cited references and further that a new header at a different frequency is modulated onto a data carrying carrier signal.

7. Applicant's arguments filed 2/26/04 have been fully considered but they are not persuasive. First, the applicant's amendments to the claim 2 while helpful, fails to overcome the

112 rejection in the office action. The language of claim 2 remains unclear as to which modulated optical signal the applicant is referring. Next, although the applicant is free to exploit any perceived weaknesses in the cited reference, making arguments against a position not taken by the examiner and ignoring the rejection made in the office action fails to advance the prosecution of the instant application. In this case, it appears that the applicant has randomly chosen to argue against the examiner's rejection of the claims based on Figure 15, when in fact the examiner, as noted by the applicant, never makes a rejection based on Figure 15. Instead, the examiner's rejections are based on Figure 12 and the cited passages in the specification of the cited reference. As such, the examiner will respond only to relevant portions of the applicant's remarks.

First, the applicant argues that the Chang and Mizrahi references are not within the same areas of technology in order to be combined. However, the examiner points out that both Chang and Mizrahi are generally concerned with optical communication systems and specifically concerned with wavelength communication systems. Furthermore, Mizrahi presents an optical method of separating two optical frequencies that is particularly relevant in Chang's multiple frequency optical system. Moreover, Mizrahi presents an efficient method of separating multiple frequencies in an optical communication system that the examiner believes one skilled in the art would have appreciated and found applicable to the system of Chang. While the applicant is correct that Mizrahi is concerned with locking the wavelength of a laser, the examiner has noted and relied upon Mizrahi's use of an optical circulator/Bragg grating combination and the implications this disclosure holds in the field of optical communication. As such, the examiner maintains the combination of Mizrahi and Chang.

In further response to applicant's argument that Mizrahi is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, it is clear that Mizrahi is both in the field of Chang's endeavor and reasonably pertinent to Chang's problem of separating spectral frequencies.

Next, in response to applicant's argument that substituting Mizrahi's filter for Chang's filter produces a non-operable filter circuit, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Furthermore, this is one of many instances where the applicant has made an argument against a position not taken by the examiner in the office action.

In response to the applicant's argument that the combination of Chang and Mizrahi is unreasonable, the examiner asserts that it is in fact very reasonable to expect one skilled in the art to appreciate Mizrahi's method and apparatus for separating optical frequencies, and further consider applying Mizrahi's teaching to the system of Chang since Mizrahi discloses an efficient method for the separation of optical frequencies while Chang is concerned with the separation of optical frequencies.

Next, the applicant contends that the examiner is seeking to change the functional steps of Chang. However, the opposite is true. In the office action, the examiner simply advocates the placement of Mizrahi's circulator and grating combination after Chang's dispersion compensator (reference numeral 1205 in Figure 12) to act as a separating for the header and payload at different frequencies. Clearly, with the circulator and grating combination of Mizrahi in this position, the functional steps in Chang are not changed in the least since the circulator and grating combination of Mizrahi would provide the payload data to fiber 1206 in Figure 12 of Chang and header information to element 1210 of Chang. As such, the examiner is not seeking to change the function steps of Chang. Rather, the examiner only seeks to provide a more efficient coupling means between dispersion compensating means 1205 in Figure 12 of Chang, fiber 1206 in Figure 12 of Chang, and element 1210 of Figure 12 of Chang.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Next, the applicant argues that claims 4 and 9 are allowable since claim 4 requires changing the wavelength of the optical carrier from the payload. However, as noted in the office action, this limitation is met by Chang in column 17 lines 3-15. The applicant further asserts that

claim 4 is distinguished form the cited art with the addition of a limitation. However, the newly added limitation is not supported by the specification.

The applicant argues that since Chang fails to state that a new header is written after switching that Chang fails to meet the limitations of the claimed invention and claims 3, 5, 8, and 13 are therefore allowable. However, a clearly noted in the office action and shown in Figure 12 of Chang a new header is indeed added after the signal has been redirected to the desired output port.

In response to the applicant's argument that Chang fails to teach wavelength conversion dictated by the control information extracted from the header, the examiner notes that Chang explicitly teaches that the optical signal is routed according to the header information. If output port contention occurs wavelength conversion takes place. As such, it is clear that since the header dictates what output port the signal is to be directed, the header, when given the broadest reasonable interpretation, is also responsible for the conversion of the optical signals wavelength. Furthermore, as stated in the office action Chang inherently teaches a tunable optical source in that such a source would be needed in order to meet the requirements of wavelength conversion required when dealing with the plurality of wavelengths present in the wavelength division multiplexing system of Chang. Moreover, Chang clearly states, "Wavelength conversion, on the other hand, resolves blocking by *transmitting at an alternate wavelength* through the same path..." Clearly, a tunable optical source is present.

8. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a tunable *laser*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the

specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

***Conclusion***

**9. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AB

A. Bello

AGUSTIN BELLO
PRIMARY EXAMINER